AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-31 (Canceled)

32. (Currently Amended) ~~The method of operating a deposition system as claimed in claim 14,~~ A method of operating an ionized physical vapor deposition system comprising:

positioning a patterned substrate having features including a field area, a sidewall, and a bottom surface on a wafer table within a processing chamber, wherein the wafer table is cooled;

creating a high density plasma in the processing chamber, wherein the high density plasma comprises ions of ruthenium and a large number of process gas ions;

exposing the patterned substrate to the high-density plasma;

performing a Low Net Deposition (LND) process step wherein a target power or a substrate bias power, or a combination thereof, is adjusted to establish an LND deposition rate;

the performing of the LND process step including depositing a ruthenium layer onto the field area at a deposition rate of greater than zero and not more than 30 nanometers per minute (nm/min) while depositing or etching ruthenium, or a combination thereof, on the sidewall or the bottom surface, or a combination thereof, by simultaneously directing ions of ruthenium and ions of inert processing gas onto the substrate and thereby depositing ruthenium onto the field area of the substrate while etching the deposited ruthenium from the field area and thereby producing substantially no overhanging material at the feature openings;

changing the process from an LND process step to a No Net Deposition (NND) process step, thereby changing the deposition rate from an LND deposition rate to an NND deposition rate; and

processing the patterned substrate using the NND process step by depositing ruthenium on the sidewall while depositing or etching ruthenium, or a combination thereof, on the field area

or the bottom surface, or a combination thereof, wherein a chamber pressure, chamber temperature, substrate temperature, a process gas chemistry, a process gas flow rate, an ICP power, substrate position, a target power, or a substrate bias power, or a combination thereof, is adjusted to change the process from the LND process to the NND process;

wherein the NND process step is used to repair ~~a barrier~~ the ruthenium layer.

33. (Currently Amended) ~~The method of operating a deposition system as claimed in claim 14,~~ A method of operating an ionized physical vapor deposition system comprising:

positioning a patterned substrate having features including a field area, a sidewall, and a bottom surface on a wafer table within a processing chamber, wherein the wafer table is cooled;

creating a high density plasma in the processing chamber, wherein the high density plasma comprises ions of ruthenium and a large number of process gas ions;

exposing the patterned substrate to the high-density plasma;

performing a Low Net Deposition (LND) process step wherein a target power or a substrate bias power, or a combination thereof, is adjusted to establish an LND deposition rate;

the performing of the LND process step including depositing a ruthenium layer onto the field area at a deposition rate of greater than zero and not more than 30 nanometers per minute (nm/min) while depositing or etching ruthenium, or a combination thereof, on the sidewall or the bottom surface, or a combination thereof, by simultaneously directing ions of ruthenium and ions of inert processing gas onto the substrate and thereby depositing ruthenium onto the field area of the substrate while etching the deposited ruthenium from the field area and thereby producing substantially no overhanging material at the feature openings;

changing the process from an LND process step to a No Net Deposition (NND) process step, thereby changing the deposition rate from an LND deposition rate to an NND deposition rate; and

processing the patterned substrate using the NND process step by depositing ruthenium

on the sidewall while depositing or etching ruthenium, or a combination thereof, on the field area or the bottom surface, or a combination thereof, wherein a chamber pressure, chamber temperature, substrate temperature, a process gas chemistry, a process gas flow rate, an ICP power, substrate position, a target power, or a substrate bias power, or a combination thereof, is adjusted to change the process from the LND process to the NND process;

wherein the NND process step is used to deposit ~~a barrier~~ the ruthenium layer.

Claims 34-93 (Canceled)

94. (Currently Amended) ~~The method of claim 92 wherein:~~ A method of processing semiconductor substrates by depositing material into features of the patterned substrate having a field area, a sidewall, a bottom surface, and an opening, while producing substantially no overhanging material at the opening, the method comprising:

positioning a patterned substrate on a wafer table within a processing chamber of an ionized physical vapor deposition (iPVD) system, wherein the wafer table is cooled;

creating, in the processing chamber, a high density plasma of process gas ions that includes vaporized metal coating material having a high fraction of positive ions;

exposing the patterned substrate to the high-density plasma that includes coating material and gas ions and performing therewith on the substrate an ionized physical vapor deposition process while controlling parameters of the iPVD system to simultaneously coat and etch the substrate so as to thereby establish a net deposition rate of not more than approximately 30 nanometers per minute onto the field area of the substrate while material is deposited and etched on the sidewall or bottom surface, or a combination thereof;

the performing of the ionized physical vapor deposition process includes the depositing of a seed layer on the sidewalls of vias or trenches on the substrate, wherein the seed layer comprises ruthenium.

Claims 95-111 (Canceled)